

# Carbon Stock in Agroforestry System Implemented on Cerrado Rupestre

## Introduction

Agroforestry systems (SAFs) adopt more sustainable agricultural practices, generating ecological, economic and social benefits (Nair et al., 2009), by sequestering and storing carbon in plant biomass and soil (Lowe et al., 2022). The SAF monitored in this study was established 30 months ago through the project “Diagnosis and Monitoring of Ecosystem Services of the Cerrado Biome in Northern Goiás as Support for Agriculture”, developed in partnership between institutions. The area covers 0.5 ha and initially citrus, cucurbits and vegetables were grown. The aim of this study was to assess the Carbon Stock (CS) in the SAF compared to an area of Cerrado Rupestre (CR) on the same property.

## Results and discussion

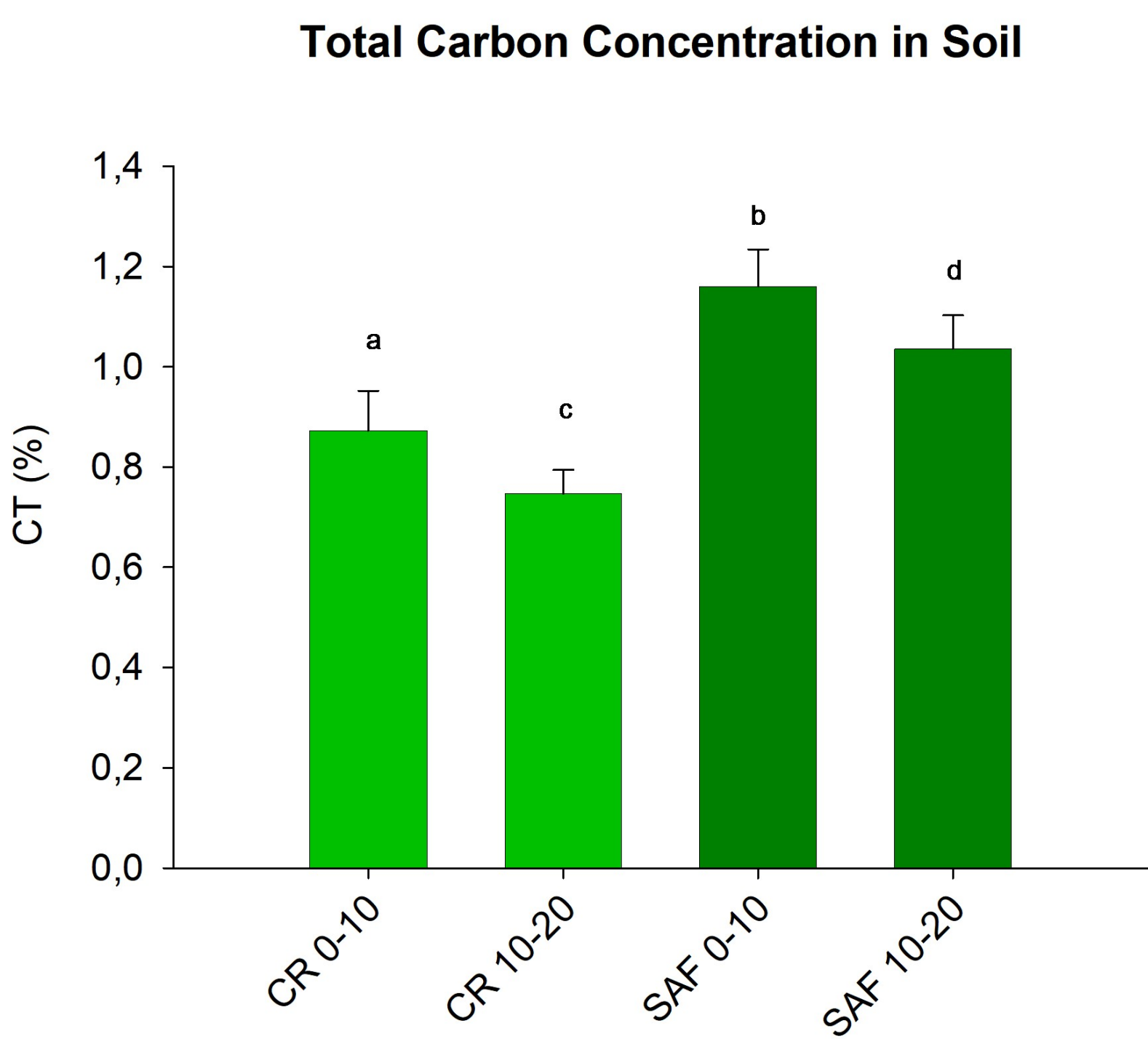
CT (%) was higher at 0-10 and 10-20 cm ( $0.038 \leq p \leq 0.0495$ ) under SAF ( $1.16 \pm 0.08$  and  $1.04 \pm 0.06$ ) than under CR ( $0.87 \pm 0.08$  and  $0.74 \pm 0.06$ ) - Figure 2. EC ( $\text{Mg ha}^{-1}$ ) was significantly ( $p=0.043$ ) higher under SAF ( $42.91 \pm 2.30$ ) than under CR ( $31.87 \pm 2.30$ ) in the 0-30 cm soil layer - Figure 3.

## Methods

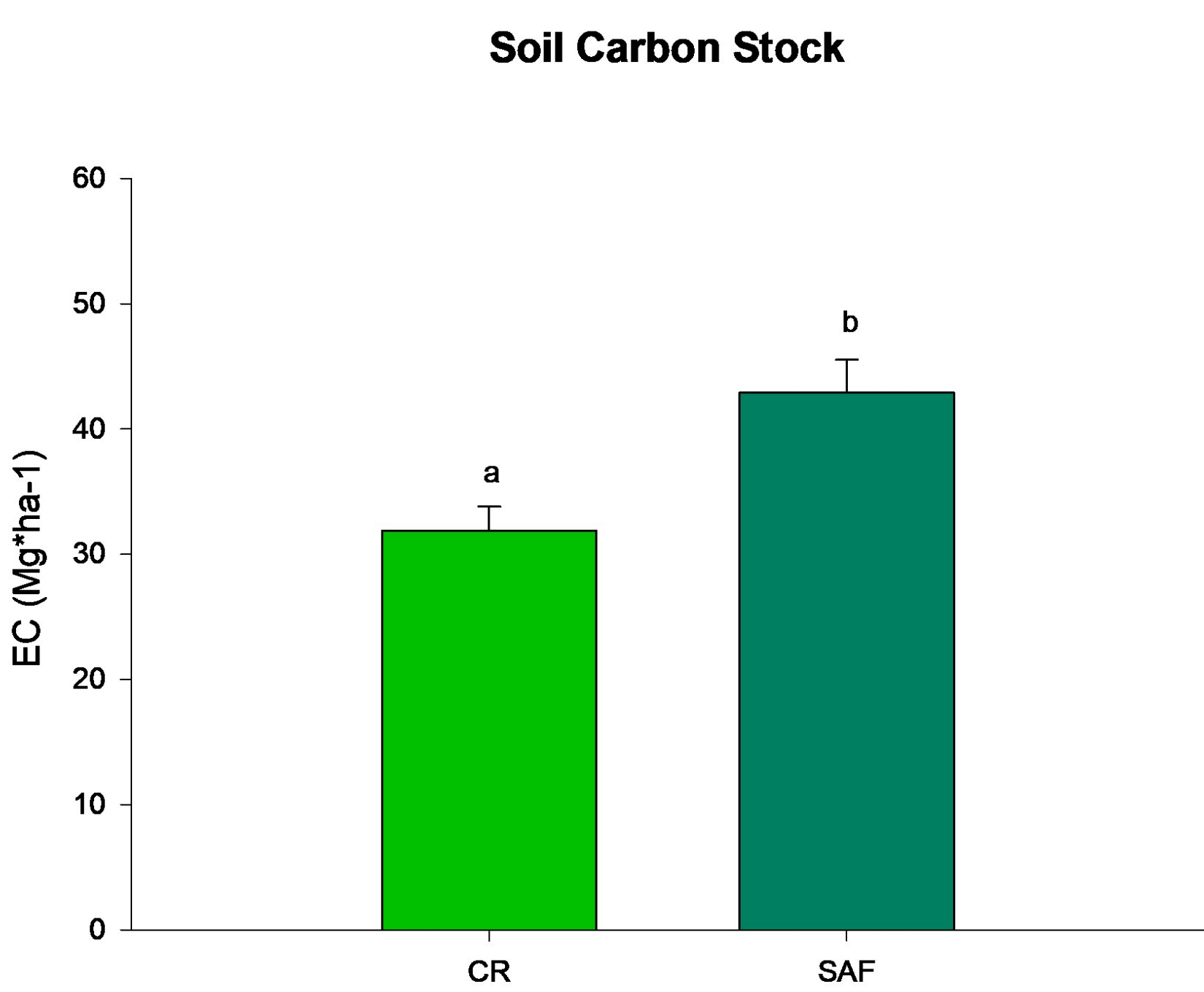
This work was carried out on the recently planted SAF on argisol (clay~14,6%) located in the rural area of the municipality of Niquelândia, in the north of Goiás, in the Cerrado region. Soil sampling was carried out at depths of 0-10, 10-20 and 20-30 cm in January 2024 in 04 equidistant trenches within each SAF and CR area (Figure 1). The concentration of total carbon (CT %) was determined by elemental analysis via combustion. EC ( $\text{Mg ha}^{-1}$ ) was calculated considering the average soil density ( $\text{g cm}^{-3}$ ) for each depth of the CR area.



**Figure 1:** Study areas: SAF (left) and CR (right).



**Figure 2.** Total carbon concentration in the soil (TC, %) under Cerrado Rupestre (CR) and Agroforestry System (SAF) at depths of 0-10 and 10-20 cm. Columns with different letters are significantly different according to the Tukey test ( $p \leq 0.05$ ).



**Figure 3.** Carbon stock ( $\text{Mg ha}^{-1}$ ) in the 0-30 cm layer of soil under Cerrado Rupestre (CR) and Agroforestry System (SAF). Columns with different letters are significantly different according to Tukey's test ( $p \leq 0.05$ ).

## Conclusion

The recently planted Agroforestry System (SAF) in sandy Cerrado soil contributed positively to soil carbon storage.

### AUTHOR(S)

Maloni Montanini Mafei César<sup>1</sup>, Manuel Eduardo Ferreira<sup>2</sup>, Márcio Roberto de Souza Júnior<sup>1</sup>, Márcia Thais de Melo Carvalho<sup>3</sup>, Beata Eموke Madari<sup>3</sup>, Samantha Salomão Caramori<sup>1</sup>

### AFFILIATION OF AUTHOR(S)

1. Universidade Estadual de Goiás/UEG
2. Universidade Federal de Goiás/UFG
3. Embrapa Arroz e Feijão/CNPAF

### ACKNOWLEDGEMENTS



### REFERENCES

Lowe, W.A.M., Silva, G.L.L.P., Pushpakumara, D.K.N.G. Homegardens as a modern carbon storage: Assessment of tree diversity and above-ground biomass of homegardens in Matala district, Sri Lanka. Urban Forestry & Urban Greening. 2022. <https://doi.org/10.1016/j.ufug.2022.127671>.  
Nair, P.K.R., Kumar, B.M., Nair, V.D. Agroforestry as a strategy for carbon sequestration. J. Plant Nutr. Soil Sci. 172, 10–23. 2009 <https://doi.org/10.1002/jpln.200800030>.

### INDICATION OF THE CORRESPONDING AUTHOR

Maloni Montanini Mafei César  
Doutoranda no Programa de Pós-Graduação em Recursos Naturais do Cerrado  
Universidade Estadual de Goiás-UEG  
E-mail: maloni@ueg.br